

Claims

- [c1] 1. A conveying system comprising:
a conveyor having an outer conveying side atop which articles are conveyed along a carryway in a direction of travel, the conveyor including:
a transport element arranged to ride laterally across the outer conveying side of the conveyor transverse to the direction of travel;
and
a motor located with the transport element for driving and riding with the transport element across the outer conveying side of the conveyor.
- [c2] 2. A conveying system as in claim 1 wherein the transport element includes a housing covering the motor.
- [c3] 3. A conveying system as in claim 1 wherein the conveyor further includes a power source electrically coupled to the motor to power the motor.
- [c4] 4. A conveying system as in claim 3 wherein the power source is located with the motor and the transport element to ride with the motor and the transport element across the outer conveying side of the conveyor.
- [c5] 5. A conveying system as in claim 3 wherein the power source comprises a storage cell.
- [c6] 6. A conveying system as in claim 3 wherein the power source comprises a capacitor.
- [c7] 7. A conveying system as in claim 3 wherein the power source is rechargeable.
- [c8] 8. A conveying system as in claim 1 wherein the conveyor further includes a local controller located with the motor to control the motor.
- [c9] 9. A conveying system as in claim 8 wherein the local controller includes a switch for turning the motor on and off.
- [c10] 10. A conveying system as in claim 8 further comprising a marker disposed along the carryway and wherein the local controller includes a sensor responsive

to the marker and sending to the local controller a sensor signal indicative of the proximity of the marker to the sensor.

- [c11] 11. A conveying system as in claim 8 further comprising a system controller capable of sending command signals to the local controller and wherein the local controller forms a communications link with the system controller for receiving command signals from the system controller.
- [c12] 12. A conveying system as in claim 11 wherein the communications link is a wireless link.
- [c13] 13. A conveying system as in claim 11 wherein the local controller is assigned an address and is responsive only to command signals that include the assigned address.
- [c14] 14. A conveying system as in claim 1 wherein the conveyor further includes a lateral track along which the transport element rides.
- [c15] 15. A conveying system as in claim 14 wherein the track includes a rack gear and wherein the conveyor includes a pinion gear coupled to the motor and that meshes with the rack gear to advance the transport element across the top conveying side of the conveyor.
- [c16] 16. A conveying system as in claim 14 wherein the track includes a cog belt and wherein the conveyor includes a cog wheel coupled to the motor and that engages the cog belt to advance transport element across the top conveying side of the conveyor.
- [c17] 17. A conveying system as in claim 1 wherein the transport element includes a pushing surface for pushing against conveyed articles.
- [c18] 18. A conveying system as in claim 1 wherein the transport element includes a platform surface for carrying conveyed articles.
- [c19] 19. A conveying system comprising:
a conveyor conveying articles in a direction of travel along a carryway, the conveyor including:

a plurality of transport elements arranged on the conveyor to ride along parallel lateral tracks transverse to the direction of travel; and a motor located with each of the transport elements to drive and ride with the transport element along one of the tracks.

[c20]

20. A conveying system comprising:

a modular conveyor belt including a series of rows of belt modules hingedly linked together, at least some of the rows of belt modules including:

a transport element arranged to ride laterally across the row; and a motor located with the transport element to drive and ride with the transport element across the row.

[c21]

21. A conveyor belt module, comprising:

a module body extending longitudinally from a forward end to a rearward end, transversely from a left edge to a right edge, and in thickness from a top side to a bottom side and suitable for being interconnected end to end to other module bodies to form a conveyor belt, the module body including a top track extending transversely across the top side of the module between the forward and rearward ends;

a transport element arranged to ride in the top track; and

a motor located with the transport element to drive and ride with the transport element along the top track.

[c22]

22. A modular conveyor belt, comprising:

a series of rows of hingedly interconnected belt modules extending in width from a left edge to a right edge and in thickness from a top side to a bottom side, wherein at least some of the rows include:

a slot in the top side of the row and extending along the width of the row;

a guide disposed in the slot;

a transport element arranged to translate across the width of the row along the slot; and

a drive mechanism located with the transport element to translate

with the transport element, the drive mechanism including:

a motor; and

a gear wheel rotated by the motor and engaging the guide to translate the transport element along the slot.

[c23]

23. A conveying system comprising:

a conveyor conveying articles in a direction of travel along a carryway, the conveyor including:

a lateral slot formed in the conveyor in a direction transverse to the direction of travel;

a guide residing in the slot;

a transport element arranged to ride along the slot;

a motor located with the transport element; and

a drive element driven by the motor and engaging the guide to drive the transport element along the slot.

[c24]

24. A conveying system comprising:

a conveyor conveying articles in a direction of travel along a carryway, the conveyor including:

a plurality of transport elements arranged on the conveyor to ride along parallel lateral tracks transverse to the direction of travel; and

a motor associated with each of the transport elements to drive the associated transport element along one of the tracks; and

a local controller associated with each of the transport elements and with the associated motor to control the activation of the motor.

[c25]

25. A conveying system as in claim 24 further comprising a sensor electrically connected to an associated local controller to provide a sensor signal indicative of a position along the carryway.

[c26]

26. A conveying system as in claim 24 further comprising:

a system controller external to the conveyor; and

a communications link between the system controller and the local controller.

- [c27] 27. A conveying system as in claim 24 wherein each of the transport elements has a uniquely associated motor.
- [c28] 28. A conveying system as in claim 24 wherein the motor is located with its associated transport element to ride with the transport along one of the tracks.
- [c29] 29. A conveying system as in claim 24 wherein the local controller is located with its associated transport element to ride with the transport element along one of the tracks.
- [c30] 30. A conveying system as in claim 24 wherein the motor is disposed at a fixed position in the conveyor.
- [c31] 31. A conveying system as in claim 24 wherein the local controller is disposed at a fixed position in the conveyor.
- [c32] 32. A conveying system comprising:
a slat conveyor conveying articles in a direction of travel along a carryway,
the slat conveyor including:
a plurality of parallel drag chains driven in the direction of travel;
a plurality of parallel slats attached to and spanning the drag chains, at least some of the slats including:
a lateral slot formed in the slat in a direction transverse to the direction of travel;
a transport element arranged to ride along the slot;
a motor arranged to drive the transport element along the slot; and
a local controller associated with the motor to control the activation of the motor.
- [c33] 33. A conveying system as in claim 32 further comprising:
an electric power source external to the slat conveyor and including an ungrounded terminal; and
wherein the plurality of drag chains includes a powered drag chain electrically connected to the ungrounded terminal of the electric power source to power the motor.

[c34] 34. A conveying system as in claim 33 wherein the powered drag chain includes sockets along its length and wherein at least some of the slats include a prong that plugs into the sockets to provide the motor with electric power from the powered drag chain.

[c35] 35. A conveying system as in claim 32 further comprising a powered rail disposed in the slot.

[c36] 36. A conveying system as in claim 32 wherein the motor is located with the transport element to ride with the transport element along the slot.

[c37] 37. A conveying system as in claim 36 further comprising a powered conducting rail disposed in the slot and a brush extending from the transport element to contact the powered conducting rail to provide electric power to the motor.

[c38] 38. A conveying system as in claim 32 wherein the slat forms a cavity in which the motor is mounted.

[c39] 39. A conveying system comprising:
a slat conveyor conveying articles in a direction of travel along a carryway,
the slat conveyor including:
a plurality of parallel drag chains driven in the direction of travel;
a plurality of parallel slats attached to and spanning the drag
chains, at least some of the slats including:
a lateral slot formed in the slat in a direction transverse to the
direction of travel;
a transport element arranged to ride along the slot;
a motor arranged with the transport element to ride with and
drive the transport element along the slot.

[c40] 40. A conveying system as in claim 39 further comprising:
an electric power source external to the slat conveyor and including an
ungrounded terminal; and
wherein the plurality of drag chains includes a powered drag chain electrically
connected to the ungrounded terminal of the electric power source to power the
motor.

[c49] 49. A slat conveyor as in claim 48 wherein the electrically powered drag chain includes sockets and wherein the slat includes a prong that plugs into the sockets to make an electrical connection between the electrically powered drag chain and the slat.

[c50] 50. A slat conveyor conveying articles in a direction of travel along a carryway, the slat conveyor comprising:
a plurality of parallel drag chains driven in the direction of travel;
a plurality of parallel slats attached to and spanning the drag chains; and
an external electric power source having an ungrounded terminal electrically connected to one of the drag chains.

[c51] 51. A slat conveyor as in claim 50 wherein the external power source includes a grounded terminal and wherein the slats are grounded.

[c52] 52. A slat conveyor as in claim 50 wherein the external power source includes a grounded terminal and wherein another of the drag chains is grounded.

[c53] 53. A slat conveyor as in claim 50 further comprising a motor stationarily mounted in a cavity formed in one of the slats.

[c54] 54. A slat conveyor as in claim 50 wherein the slats include a track, a transport element, and a motor arranged to ride along the track with the transport element.